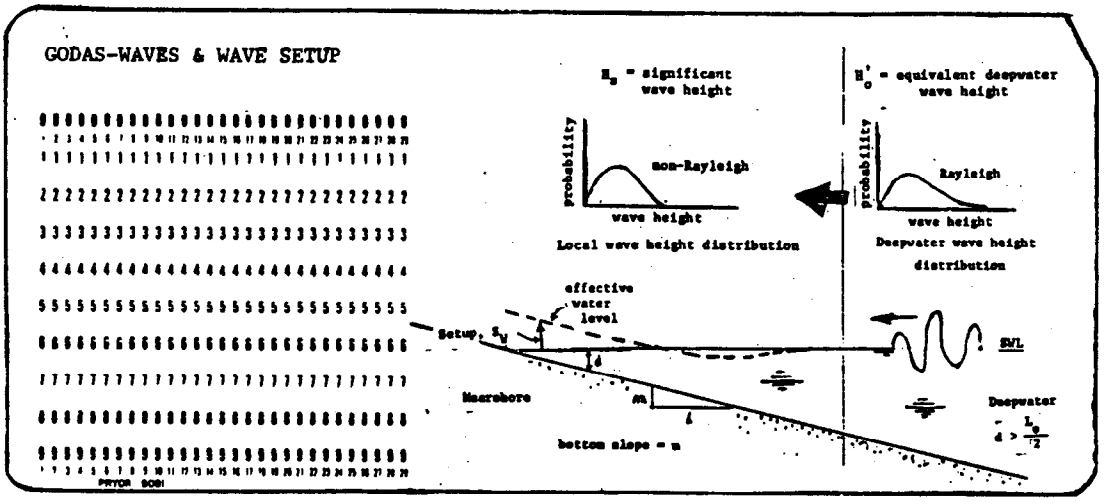
Coastal Engineering Technical Note

COMPUTER PROGRAM:
GODAS - WAVES & WAVE SETUP



PROGRAM PURPOSE: To estimate wave height and wave setup in the nearshore zone for irregular waves.

PROGRAM CAPABILITY: This program produces a tabular printout of wave height and wave setup predictions for specific water depths of interest for a given offshore slope, deepwater significant wave height and wave period. Up to 8 water depths can be specified for each beach slope/wave condition to be run.

PROGRAM APPLICATION: This program is applicable to storm wave conditions (Rayleigh distribution - See Figure) and simple beach configuration (uniform slope). It is not recommended for use with swell conditions (narrow-band spectrum) or where the wave distribution is non-Rayleigh.

PROGRAM AVAILABILITY: The FORTRAN card deck for GODAS may be obtained by Corps of Engineers Offices from the Coastal Engineering Research Center ADP Coordinator, CERDP.

INPUT:

1. Specify number of beach slope/wave conditions to be run.
2. a) Equivalent deepwater wave height, H_o'
   b) Period of the peak energy density
   c) Water depths (from 1 to 8 depths)
   d) Beach slope

OUTPUT: A table summary of predicted wave heights and wave setup for each water depth is produced. The Cumulative Distribution Function (CDF) i.e., percent less than, printout of wave heights shows the frequency occurence of different wave heights at a given depth.

SAMPLE PROBLEM FOR PREDICTED IRREGULAR WAVE HEIGHT DISTRIBUTION:

Still Water Depth, d	= 450 cm	d/H_o'	= 1.11
Bottom Slope	= 1/100	H_o'	= 400.0 cm
Deep Water Wave Steepness	= 0.0401	H_s	= 275.5 cm
d/L_o = 0.0445, T_s	= 8.00 sec	H_{mean}	= 187.4 cm
Root-Mean-Square of Surf Beat	= 13.74 cm	H_{rms}	= 202.1 cm
Shoaling Coefficient	= 1.32	H_{max}	= 339.5 cm
Setup	= 2.59 cm		

Tabular Output from Computer Program for a Given Depth

Height (cm)	Height (ft)	CDF (%/100)	Height (cm)	Height (ft)	CDF (%/100)	Height (cm)	Height (ft)	CDF (%/100)
10.000	0.328	0.002	120.000	3.936	0.215	230.000	7.544	0.685
20.000	0.656	0.007	130.000	4.264	0.250	240.000	7.872	0.732
30.000	0.984	0.015	140.000	4.592	0.287	250.000	8.200	0.777
40.000	1.312	0.026	150.000	4.920	0.326	260.000	8.528	0.817
50.000	1.640	0.040	160.000	5.248	0.366	270.000	8.856	0.854
60.000	1.968	0.057	170.000	5.576	0.408	280.000	9.184	0.887
* 70.000	2.296	0.077	180.000	5.904	0.452	290.000	9.512	0.916
* 80.000	2.624	0.100	190.000	6.232	0.496	300.000	9.840	0.941
90.000	2.952	0.125	200.000	6.560	0.542**	310.000	10.168	0.961
100.000	3.280	0.153	210.000	6.888	0.589	320.000	10.496	0.977
110.000	3.608	0.183	220.000	7.216	0.637	330.000	10.824	0.989
						340.000	11.152	0.996

* Example (1): Between wave heights 70.0 and 80.0 cm (2.296 and 2.624 ft) there occurs (0.100 - 0.077) x 100 = 2.3% of waves.

** Example (2): 54.2% of the waves will have heights less than 200 cm (6.56 ft).

REFERENCES

GODA, Y., "Irregular Wave Deformation in the Surf Zone," Coastal Engineering in Japan, Vol. 18, pp. 13-26, 1975.

SEELIG, W.N. and AHRENS, J., "Estimating Nearshore Conditions for Irregular Waves," Report (In Publ.), U.S. Army, Corps of Engineers, Coastal Engineering Research Center.